CALS TEST NETWORK

CTN Test Report
89-013

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Publishing Systems Structured Test No. 1, Summary Report

August 10, 1989

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Prepared for
Air Force Logistics Command
AITI Project

Lawrence Livermore National Laboratory

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Executive Summary

The DOD Computer-aided Acquisition and Logistic Support (CALS) Test Network (CTN) is conducting tests of the military standard for the Automated Interchange of Technical Information (MIL-STD-1840A) and its companion suite of military specifications. The CTN is a DoD-sponsored confederation of voluntary participants from industry and government, managed jointly by a technical staff at Air Force Logistics Command (AFLC) and Lawrence Livermore National Laboratory (LLNL). The objective of CTN tests is to demonstrate and evaluate the interchange and functional use of digital technical information between industry and government using the CALS standards.

Publishing Systems Structured Test No. 1 was devised by the CALS Test Network staff and several representatives of SGML-oriented publishing vendors at TechDoc XIII in August, 1988. The objective of the test was to help settle some of the issues that arose during the attempt to formulate an Output Specification to accompany the conforming Document Type Definition of Specification MIL-M-38784B ("MIL-B"). The approach was to obtain consensus on interpretation of MIL-B by having several vendors compose the same Standard Generalized Markup Language (SGML) text file, and then comparing the results. The consensus might then speed the process of developing the Output Specification (OS).

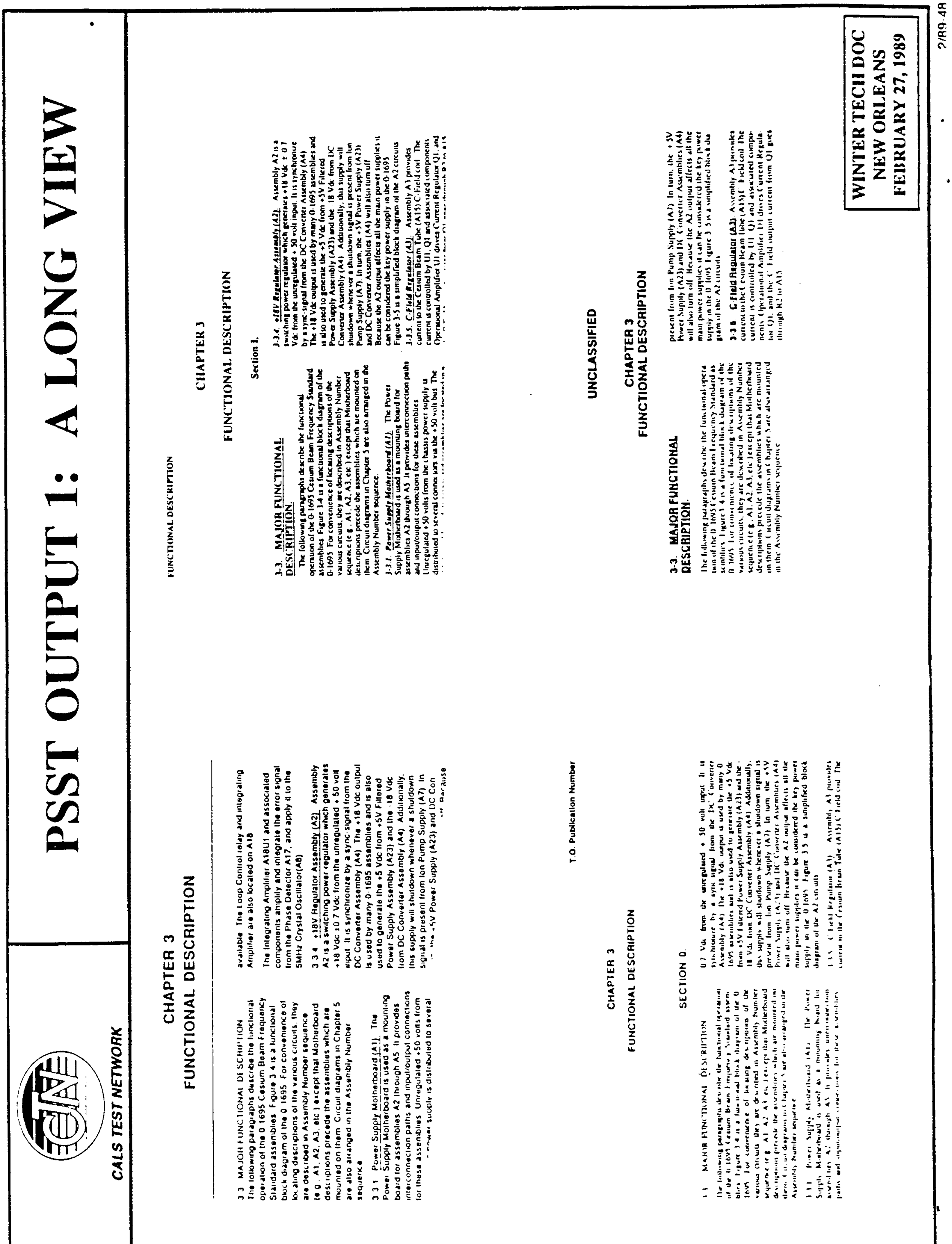
Two text files (documents) were included on the magnetic tape sent to nine volunteering companies. The first text file was prepared by SoftQuad, Inc. and the other by the CTN Technical Publications Testbed. The SGML text files were composed and printed on paper, and returned to the testbed. The resulting images were compared and significant differences were photostated and mounted on presentation slides for TechDoc Winter '89. The last section of the report contains all of the charts presented at the TechDoc Winter Meeting. The charts are referred to in the report as Exhibits.

The observations gathered showed that there was little consensus even on what might be called major elements of formatting in accordance with MIL–B (see Figure 1). In summary, the major points of non-consensus or non-compliance with MIL-B are:

- Inconsistencies were similar for both documents, but the second document tended to exaggerate some of them.

- Use of running heads was not consistent with MIL-B.

Figure 1
Four Pages Composed From Identical SGML Imput



- Typography was inconsistent among vendors and with MIL-B.

- Some vendors ignored certain SGML tags that had a major effect on the appearance of the composed image.

- The interpretation of attribute values in the SGML tags was inconstent.

- The process used to create the SGML text file for the first document did not apply the DTD of MIL-M-28001 correctly. Also, the occur rence of a space character following a hyphen was noted in several cases.

- There was no consensus on hyphenation and justification.

- Formatting lists and tables proved to be less of problem than was expected, but the formats still varied greatly. (See Figure 1 and Exhibit 5.)

- Efficiency of page layout also varied greatly. The number of pages required to image the first document ranged from five and a fraction pages to over eleven pages.

It is clear that there is little consensus in interpreting MIL-B. There seemed to be some uncertainty also with respect to interpreting SGML tags and their attributes. It is highly probable that any source of format specification, be it an OS or another revision of MIL-M-38784, will have to attain a degree of rigor equal to the DTD that it supports.

The general recommendations of the report are:

- Permissible values for attributes in Specification MIL-M-28001 need to more rigorously defined.

- Acceptance quality control tools are needed to detect misuse of a DTD.

- The OS now under development could replace the formatting information found in MIL-B and other format-oriented Military Specifications.

- Future PSST tests might best serve CALS goals by emphasizing early testing of changes and additions to the CALS core standards. The impend ing OS for Specification MIL–M–28001 is one obvious opportunity.

Comments on the initial draft of the report were kindly provided to the CTN Technical Publications Testbed by Context, Datalogics, and SoftQuad.

1 Preparation and Processing

During the Graphics Communications Association (GCA) TechDoc XIII Conference, August 1988, discussion and debate carried over from other CALS meetings about the ongoing effort to formulate an Output Specification (OS). An OS defines the format of documents that have been tagged in accordance with the SGML Document Type Definition (DTD) provided in Specification MIL-M-28001. The DTD is now and the OS will be an appendix to the basic specification, MIL–M–28001.

The DTD defines the structure and content of a conforming document, and the OS will specify the format or appearance of the document in paper form. The first attempt at constructing an OS was unsatisfactory to many, and therefore the exchange of opinions continued. Yuri Rubinsky, President of SoftQuad, suggested that it might be instructive to have the same SGML text file composed by several publishing systems vendors to see how they interpreted the requirements of MIL-M-38784B (hereafter known as MIL–B). The understanding arrived at during the meeting at TechDoc was that each participant would compose the documents in the way that best conformed to MIL-B, in their opinion. It was hoped that some consensus could be derived from the resulting images, and that this consensus would contribute to forming a usable OS for MIL-B documents.

SoftQuad volunteered to prepare the SGML text file. The test data thus prepared was one chapter from a U. S. Navy technical manual. The file was sent to SYSCON in MIL–STD–1840A format, where another text file was added. This second text file had not been passed through an SGML parser and contained both intentional and unintentional tagging errors. No illustrations were included in either file set. Identical copies of the two SGML text files, tagged in accordance with the MIL-M-28001 conforming DTD, were sent (in MIL-STD-1840A format) to nine vendors of publishing systems or other interested parties that had agreed to participate in the experiment. No written instructions were sent with the data.

In the first file set (document), the U. S. Navy technical manual fragment, the origin and preparation of the document was described in the following excerpt from the text file:

SGML COMMENT

> <!— This document was created from pages provided by the U.S. Navy, scanned, marked up using the Avalanche Intelligent Markup System, cleaned and verified using SoftQuad Author/Editor and double checked with the Sobemap MARK-IT parser. —>

The fragment used, Chapter 3, constituted only a portion of what would have been found in a complete transmission of an SGML tagged text file. The original document was scanned by a third party and was not available to the person overseeing the tagging and composition. A printed copy of the original source document was not given to the CTN test platform or any of the test participants. The second document was a special-purpose CTN "circuit test" document. The intent of this document was to provide measured blocks of text (1000 and 2000 characters) to highlight differences in font set-widths and vertical leading and to exaggerate certain conditions encountered in hyphenating and justifying lines of text.

Six sets of paper images were received from the group that volunteered. Each of the contributors supplied comments regarding their SGML parsing actions and any fixes that they made to the source files. Only five image sets had been received by the time the preliminary results were prepared for the Winter TechDoc meeting in New Orleans. One set (from Software Exoterica) was not included because it did not follow MIL-B but rather followed the Canadian National Defense Forces guidelines for technical documentation.

2 Test Results

The test methods for this experiment differed completely from any of the tests previously conducted by a CTN test platform. All observations were purely visual, with no assists from the usual array of test tools that have been acquired or developed for the Technical Publications Text Platform. The test procedure was purely ad hoc, and therefore, readers are invited to add their own observations to the analysis of the results presented here. Section 5 contains the viewgraphs presented at TechDoc Winter '89. They are numbered as Exhibits 1 through 35.

The graphic material presented here and in the TechDoc presentation was created by photostating selected pages of the hard copy received, and then cutting out and mounting interesting portions of each photostat for side–by–side comparison.

The Exhibits use a convention of displaying four examples in two rows, with the upper left example taken from Vendor "A" output, upper right from Vendor "B," lower left from Vendor "C," and lower right from Vendor "D." Vendor "E" output was not used; Vendor "F" output arrived too late to be included in the TechDoc Exhibits, but is discussed in this report. The letter designations rather than vendors names were used to ease the discussion of test results, rather than to cloak the identity of the participants. Because this experiment aimed at obtaining consensus rather than measuring conformance, the identity of the participants is only of casual interest. Table 1 is provided for those whose curiosity is still unmitigated.

Table 1 PSST Participating Vendors Code Letters

A. SoftQuad	D. Interleaf
B. Scribe	E. Software Exoterica
C. Datalogics	F. Context

The test results for both documents were similar. In previous reports, each document tested was discussed separately in order to focus on the results from processing digital files. In this experiment, both documents will be discussed concurrently with differences between the documents noted where interesting.

The general progression of analysis will start with "headings" (chapter and section heads, running heads) and continue with discussions on paragraph headings, justification, lists, tables, and page layout efficiency,

2.1 Headings

The first page of the documents showed a startling difference in overall appearance or gestalt. (See Exhibits 5 and 18 and Figure 1 in the Executive Summary.) In addition to the obvious variations in type faces and sizes, the omission or inclusion of certain elements of text was not uniform. Substantial variations such as those seen here were not expected in that MIL-B provides specific guidelines with respect to style of face, type size, and manner of emphasis. See Exhibits 31-33. It is clear from the lack of consensus that:

a. MIL-B is too ambiguous or difficult to interpret, or that

b. the DTD in MIL-M-28001 requires clarification, or

c. the Vendors felt that the dicta of MIL-B did not apply to these docu ments.

This writer finds it difficult to defend the clarity of MIL-B. (See discussion under "Paragraph Headings.") However, most paragraphs and sentences that will affect the image appearance can be interpreted in some positive manner, and not ignored. It would seem that if the OS to be added to MIL–M–28001 were at the same level of rigorous specification as is the DTD in Appendix A of Specification MIL-M-28001, then the variability in format style would be at least sharply reduced.

Exhibit 6 shows the differences of interpretation regarding technical document numbering, running heads and security classification markings. Only Vendor B provided a running head, but no technical manual number. Only Vendor C provided a place holder for the technical manual number. The front matter tags which would supply a value for technical manual number were not present in this fragment. As observed by this writer,

a. documents that are entirely unclassified do not have any security classification marking;

b. running heads do not appear on pages with chapter or section titles; and

c. technical manual identification numbers appear on all pages.

The documents were inconsistent in this respect.

The five sources included in this analysis (Vendor E was excluded) produced images for 8.5 by 11-inch, two column format, conforming to MIL-B guidelines. All five inputs presented "Chapter 3" as centered, bold, in a type size larger than the body of text. The title, "Functional Description", appeared in the same style directly underneath the chapter number. Four of the five samples used a sans-serif typeface for the titles. Vendor B used a serif typeface. The typeface was consistent with the chapter title.

2.2 Section Heads

The omission or inclusion of certain elements is a more serious matter than variations in type size and placement. Only Vendors B and C included the "Section n" head, specified by the <section label="0"> tag in the first source file. (See Exhibit 4 for the SGML input and Exhibit 7 for the formatted output.) Vendor A ignored the tag for typesetting purposes. This same source used a horizontal rule to separate the chapter head from the remainder of the text. This practice is not suggested by MIL-B.

The attribute value of label="0" (Arabic zero) in the first source text file raises several questions. MIL-B requires that sections be numbered with Roman numerals. It would appear that the value for the attribute is impossible to honor in the context of MIL-B. Vendors B and F converted the "0" to "I", probably by manual intervention. Vendor C used the value literally just as the label attribute in the chapter tag was used literally. The second source file did not supply a value for the label attribute, yet Vendors B and C assumed a default value of "I" and printed it (see Exhibits 7 and 21). The questions raised here then are:

a. should an SGML parser be fed the permissible values for attributes and check them, and

b. should the OS specify the default values to be assumed when an attribute is missing?

In the second document, the differences were even broader. Vendor A did not use a page break and start a new page as recommended by MIL-B. This, coupled with the absence of a section head and any paragraph numbering, made the beginning of section two hard to find. Vendor B did supply the section heading, but without a page break. Vendor C, D, and F all started a new page for the second section.

2.3 Paragraph Headings And Numbering

Exhibits 9 and 23 provide examples of paragraph headings and numbering. The table below, based on the first test document (Exhibit 9), presents the most noticeable differences. Some corrections to the Exhibits are included in the table. The row headings of the table are abbreviated questions, and the cell entries are answers by vendor. Vendor F is included in Table 2, but not in the Exhibits. If any row contained all "yes" or "no" entries, then the vendors would be in consensus about that question.

Table 2. Paragraph Header Styles

Vendor	A	B	C	D	F	Consensus
MIL-B numbering	yes	yes	yes	yes	yes	5/5
Same face as body	yes	yes	yes	no	yes	4/5
1st Heads underlined	no	yes	yes	yes	yes	4/5
2nd Heads underlined	yes	yes	yes	yes	yes	5/5
Heads boldface	no	yes	no	yes	no	3/5
Same size as body	yes	n/y	yes	yes	yes	4/5
Heads italicized	no	yes	no	no	no	4/5

The major item of disagreement, in this case, seems to be the use of boldface type in the paragraph headings. Even though the numbers indicate a high degree of consensus, the appearance of the headings in Exhibits 9 and 23 provides a different impression. It is interesting to note that Figure 3 from MIL-B (Exhibits 32 and 33) does not mention underlining as a means of emphasizing paragraph and subparagraph heads.

In the second test document, a surprise was encountered. This document was tagged as having two sections. Vendor A did not number the paragraphs at all. Vendors B and F began the second section with a primary paragraph numbered "7." Vendor D began the second section with "1-7." Vendor C began the second section with "2-1," the method of paragraph numbering that this author thought was prescribed by MIL-B.

After some research, an explicit definition of how to number paragraphs could not be found in MIL-B, paragraphs "3.2.3 Numbering," or "3.2.11 Divisions," or in the illustrations provided in Exhibit 34, and MIL-B Figures 6 (Exhibit 35), 9, 17, 22, 23, and 42.

MIL-B is incomplete with respect to defining how primary paragraphs will be numbered when the various combinations of chapters and sections occur. The first test document used the combination <body><chapter>...<section><para0> whereas the second document used only <body><section><para0>. The OS now under review should give attention to this particular matter.

The requirement to use run-in text for subordinate sideheads ("The text shall begin on the same line as the title,..." — MIL-B, page 12, last paragraph) was followed by four of the five outputs examined.

After the presentation at TechDoc, another anomaly with paragraph heads was discovered. In this case, Vendors A and D apparently did not recognize <subpara2> tags. For example, in preparing the text file, Vendor A chose to use the follow sequence of tags (lines without tags have been deleted):

Document 1: List Tagged as Procedural Steps

```
<SUBPARA1 LABEL="3-3.12" HCP="0"
SCILEVEL="0"><TITLE >5-90 MHz Multiplier Module
(A1O). </TITLE>
<PARATEXT > Assembly A10 receives 5 MHz, 1 volt (&PM;
major circuits comprise A10: </PARATEXT>
<STEP1 LABEL="a."><PARATEXT >5 MHz Phase Modulator
</PARATEXT></STEP1>
<STEP1 LABEL="b."><PARATEXT >5 to 10 MHz Doubler
</PARATEXT></STEP1>
<STEP1 LABEL="c."><PARATEXT >10 to 30 MHz Tripler
</PARATEXT></STEP1>
<STEP1 LABEL="d."><PARATEXT >30 MHz Band pass Filter
```

```
</PARATEXT></STEP1>
<STEP1 LABEL="e."><PARATEXT >30 to 90 MHz Tripler
</PARATEXT></STEP1>
<STEP1 LABEL="f."><PARATEXT >90 MHz Driver/90 MHz
</PARATEXT></STEP1>
<SUBPARA2><TITLE></TITLE> <PARATEXT>One 90 MHz,
A10 Multiplier is about +4 to +6 Vdc   </PARATEXT>
</SUBPARA2>
<SUBPARA2><TITLE></TITLE><PARATEXT></PARATEXT> </
</SUBPARA2></SUBPARA1>
```

The automated software tagged the list as procedural steps. The DTD requires that the </step1> tag be followed by two <subpara2> sequences. The <subpara> tags require <title> and <paratext> content. In any event, ignoring a document structure tag such as <subpara2> is difficult to explain here just as it was with the <section> tag. A simpler method of tagging would have been:

Retagging of Fragment Above

```
<SUBPARA1 LABEL="3-3.12" HCP="0"
SCILEVEL="0"><TITLE >5-90 MHz Multiplier
(A1O). </TITLE>
<PARATEXT > Assembly A10 receives 5 MHz, 1 volt (&PM;
major circuits comprise A10: </PARATEXT>
<randlist>
<item>5 MHz Phase Modulator</item>
<item>5 to 10 MHz Doubler</item>
<item>10 to 30 MHz Tripler</item>
<item>30 MHz Band pass Filter</item>
<item>30 to 90 MHz Tripler</item>
<item>90 MHz Driver/90 MHz Output Amplifier</item>
</randlist>
<PARATEXT>One 90 MHz
A10 Multiplier is about +4 to +6 Vdc. </PARATEXT>
</SUBPARA1>
```

This method avoids the use of <subpara> tags where the tagger clearly did not want the sidehead to appear in the composed text. The use of the <randlist> tag without the label attribute reflects this writer's interpretation of the list in question as being a non-sequential list of items.

Continuing on the subject of <subpara> tags, the recognition/non-recognition phenomena also occurs in paragraph 3-3.27 of the first document. Vendor A

and Vendor D did not output a sidehead that corresponded to the <subpara2> tag. Vendors C and F output a sidehead even though the tag had no value for the label attribute. It is assumed that these vendors have composition systems that can switch from explicit values to computed values of an attribute. The tagger of this document could more easily have used successive <paratext> tags to achieve the apparent intent.

The subparagraph numbers at the end of the first document appear inconsistent, but, in most cases, they reflect the value of the "label=" attribute in the <subpara> tags. Those tags are listed below (the lines have been truncated):

```
<SUBPARA1 LABEL="3-3.27."><TITLE >Filtered Battery Crossover
<SUBPARA1 LABEL="3-3.28."><TITLE >Time Code Buffer (A33).
<SUBPARA2 LABEL="3-3.29.1"><TITLE >PPM Amplifier (A34).
<SUBPARA2 LABEL="3-3.30." HCP="0" SCILEVEL="0">
```

Vendors B and F did not handle the out-of-sequence numbers consistent with the label attribute values.

2.4 Justification And Hyphenation

MIL-B states the following "Copy shall be prepared as specified below, unless it can be prepared as economically in double-columned justified right margin format." No conclusion can therefore be drawn by examining Exhibits 11 and 25. Vendors C, D, and F clearly thought that fully justified text was as economical to produce as "ragged right." The truth of this would be difficult to determine in any case. Document 2 as typeset by Vendor F contains at least one example, paragraph 8-3, of why the choice of fully justified text must be balanced against the hyphenation technique to be used.

On the subject of hyphenation, and for the purposes of this report, two terms are defined:

- hard hyphen - a hyphen placed in the source text file by the author, as in "DC-to-DC Converter;"

- soft hyphen - a hyphen placed in the image of the text at the end of a line to indicate that the text composition software divided a word.

An SGML-tagged text file cannot, by definition, contain soft hyphens. A file of tagged text is a source file, i.e., a file in the IWSDB that can be called up for composition against a variety of OS's.

With respect to soft hyphenation, all except Vendor B employed it. Vendor B did not appear to use hyphenation in the composition of either document. Both documents were composed by Vendor B with left-justified text.

With respect to typesetting hard hyphens, this test provided an interesting case. The source file for the first document contained several cases (see table below) where a hard hyphen was followed by a space. In the Declaration portion of the DTD in MIL-M-28001, the hyphen character is not declared as a token separator whereas the space character is so defined.

Table 3. Instances of a Hyphen Followed by a Space (prefixed with line number of source document 1.)

133 transformer-coupled, DC-to- DC Converter which
250 out-of- lock signal is applied to the A19 Logic Assembly
268 signal. A 1/4 wave- length cavity selects the
464 output and by R9 for the rear- panel 100 KHz output. Q3
503 to the time-of-day display. This 1- second step is needed
612 <PARATEXT > A30 is a +28 Vdc Float-Voltage Charger, current- limited
658 code output level is +6 Vdc PM;1 volt for time- marks

Examining the composed text from Vendors A, D, and F showed that they all treated the ASCII space code after the hyphen as a token or word separator and placed a "space-between-words" in its place.

The presence of the gratuitous space code has another impact. If the source text file were to be placed in an IWSDB, the presence of this space code would adversely impact the indexing of the text as well as the use of text search tools. To prevent the acceptance of data with this flaw, some sort of software tool will have to be added to quality control tools (such as spelling checkers and SGML parsers needed for preparing compliant file sets).

2.5 Lists

The fragments of the list in the first document are shown in Exhibit 13. The fragments are referred to here as lists because the context of the document permits no other interpretation. The items were not tagged as <randlist>

elements, but as procedural steps. The tagging is incorrect in this context. Vendor B apparently decided to modify the input so that their composition software would typeset this as a list (with numbered items per MIL-B, see Exhibit 35) rather than as a series of procedural steps (with lower case letters for each item).

The list revealed an interesting case. The SGML text file defined an entity that was intended to be typeset as an over-and-under plus/minus sign. Referring to Exhibit 13, it can be seen that only two of the examples show an over/under plus/minus character. Vendors A and B typeset this character, Vendor C omitted the character, and Vendor D "rejected" the entity reference, as did Vendor F (not shown). The first question that arises is whether or not this entity definition is the proper way to convey this type of data. Various alphabets have been defined in IS 8879 to cope with this sort of situation. One of them could have been used. A second question arises with respect to one of the goals of MIL-STD-1840: to provide the maximum degree of automated processing possible. The use of this sort of entity requires that the Destination System have someone intervene in the process to resolve the entity reference. According to received advice, the correct manner of handling the entity is shown in the output of Vendor D in Exhibit 13 where the entity reference was output character for character.

A sharp-eyed member of the TechDoc audience noted that the output from Vendor D (Exhibit 13) had apparently lost some text that follows item "c" in the list.

Exhibit 27 from the second test document shows another story. The list was defined as <seqlist>. The most noticeable difference is that Vendor A did not number the list items, as did all the other Vendors. A second difference is in the treatment of the list title, "Word List." This title was:

a. left justified by Vendors A and D;

b. typeset as a subparagraph title by Vendor B;

c. centered by Vendor C;

d. aligned with the first letter of the words in the list by Vendor F.

There seems to be little consensus on this relatively simple matter.

2.6 Tables

Exhibits 15 and 29 show fragments from the tables in the test documents. Exhibit 29, for the second document, has a placement error. The examples for Vendors C and D have been switched.

The exhibits cannot show the placement of the table relative to the text that refers to it. For the first document, the placement was consistently correct: that is, the table appeared reasonably soon after the text reference to it. The placement of the two table occurrences for the second document is relatively consistent, except for Vendor B, who placed both tables before the text that referred to it.

Exhibit 15, for the first document, shows an inconsistency in placement of the table title by Vendor B. In this exhibit, the placement of the examples varies slightly because of the size of the fragments. The upper-most fragment is from Vendor A, the next from Vendor B, and so on. Vendor F set the table within one column in double column text. This was not in accordance with the table tag attributes. Exhibit 29 shows that Vendor A did not assign a number to the table.

The use of rules within the table in the first document was obviously inconsistent. The table tags called for:

- siderules explicitly — Conformance: 4/5
- rules between columns explicitly — Conformance: 4/5
- no rules between rows by default — Conformance: 3/5
- portrait orientation by default — Conformance: 5/5
- full page width by default — Conformance: 4/5

A reading of MIL-M-28001 did not reveal any particular ambiguity or inconsistency in the definition of the attributes for the <tabdef> tag. Head and foot rules were consistent, but horizontal rules within the table were not. Vendor F set the table with no horizontal rules other than head and foot. That vendor also set the table with no vertical rules (acceptable per MIL-B), but, again, not in accordance with the table tag attributes.

In the second document, (Exhibit 29) the use of rules was more consistent. The <tabdef> tags in this document specified:

- siderules explicitly — Conformance: 5/5
- rules between columns explicitly — Conformance: 5/5
- rules between rows explicitly — Conformance: 5/5
- portrait orientation by default — Conformance: 5/5
- full page width by default — Conformance: 5/5

Apparently, the explicit requirement for rules between rows caused all the vendors to comply, whereas in the first document the default requirement was ignored by Vendors B and D.

In several cases, the composition of the second document caused a table to be split across two pages. In this case MIL-B (3.2.9.2.3 and Figure 8) states that the "closing" rule is omitted at the foot of a continued table or chart; the "opening" rule is omitted at the head of the continuation thereof. In the two cases where the table was continued, the closing and opening rules were not omitted. In this case there is a conflict between MIL-B typesetting rules and the specifics required by the attributes in the <tabdef> tags. The OS must take account of situations like this, and provide a hierarchy of rules.

The <colbddef> tags for this table specified left justification for column 2, centering for column 3, right justification for column 4, and default values for columns 1 an 5. The <colbddef> attribute "right=1" (right justify all entries) for column four of this table was heeded by all but Vendor F. All Vendors honored the default and explicit alignment direction for the other columns.

Column 10, row 5 of the second document contains, by design, more text than can fit on a single line. None of the vendors had any difficulty in setting a "mini-paragraph" in this cell. Vendor F also extended column 10 row 3 to a second line containing one word.

The width attribute values in the <entry> tag are supposed to sum to 100%, but did not. Vendor C noted in the listing of the second document after correcting tagging errors that several of the values for "width=" were changed. This may have produced a more acceptable appearing output, but was contrary to the spirit of the experiment. It is not known if any of the other sources also changed these width values.

2.7 Page Layout

Given that the body of the text is typeset to provide easily readable material (considering type size, line length, justification and vertical leading), there is some interest in the relative efficiency of presenting the text; i.e., the amount of text per page. If readability criteria can be met, then the more text per page, the better. Another way of saying this is that the more compact the document, the lower the cost to produce, maintain, store, and use. The list that follows recounts the number of pages needed to print the first document.

- Vendor A - 8 pages, last page 1/3 full
- Vendor B - 6 pages, last page nearly full
- Vendor C - 6 pages, last page full
- Vendor D - 6 pages, last page 1/3 full
- Vendor F - 12 pages, last page half full

Vendor F output seemed to be double spaced in double columns. In the second document, the vertical leading was closer to the expected, although still very liberal. Comparisons of efficiency for the second document are difficult because of the varying interpretation of the second occurrence of a <section> tag previously mentioned.

The status attribute in the <doc> tag for the second document had a value of "draft." The default value for the status attribute is "formal." Vendor C interpreted the value "draft" to mean that the text should be set in classic draft form (double spaced), while the other sources ignored this attribute value. The question that arises here is how to interpret attributes. That is, when is the value of an attribute for information only and when should it be heeded and acted upon. This issue occurred many times during the analysis of the test data.

Vendor B did not adhere to the recommended 20 pica width for double-column format. (See Exhibit 16.)

3 Summary of Recommendations

The recommendations stemming from this experiment apply to four topics: the DTD in MIL-M-28001, the OS in MIL-M-28001, MIL-B, and future tests.

3.1 DTD Of MIL-M-28001

It is clear that the use of default values of attributes, for document maintenance and databasing as well as imaging, requires better definition than is now found in the DTD (MIL-M-28001). Where there is no intent in the DTD that the attribute value be machine processable (i.e., interpreted by imaging software), then that condition should be clearly noted as a deviation from the rule. In the case of the label attribute found in several structure tags, the number system may have to be specified along with the range. For documents to be formatted in accordance with MIL-B, for example, the value of the label attribute in the section tag must be represented by Roman numerals ranging from "I" to infinity. Application of this concept would permit SGML instance parsers to validate the attribute values. The concept is also format dependent to a degree, and should be implemented with a view to maintaining the format independence that is the intent of SGML. An alternative approach would be to define the values found in attributes such as "label" as Arabic ordinal numbers, where the imaging software is required to map the attribute value into the correct numbering system. Although either approach will work, the second concept seems more in harmony with the intent of SGML.

Additionally, it is suggested that a policy be established that attributes intended to convey format-dependent information (such as paragraph numbers) be used only in cases (such as change pages) where the value cannot be computed from the initial conditions assumed for "page 1."

The "plus-minus" entity defined in the first document raises an issue with respect to automation. It is questionable whether defining a typographic object outside of the alphabets already defined in IS 8879, where one of those alphabets provides the object wanted, ought to be accepted practice. In general, it seems undesirable to require human intervention to match an entity description to an available typesetter character when composing an image. In a highly automated environment it would be desirable to make the match one time for a large group of documents and record the match "in" the composition software.

There were several cases of incorrect use of the DTD of MIL-M-28001 that passed through SGML document instance parsers. If such mis-applied tagging were to be allowed into the IWSDB then several functions that the IWSDB is expected to support will be impacted: document maintenance and search and retrieval of document content being two examples. Acceptance procedures must be devised that can detect conditions of this kind. SGML parsers cannot, as this test demonstrated, detect mis-application of a DTD. Use of an expert system might be one approach that could be readily implemented.

3.2 OS Of MIL-M-28001

The results of the composition process likewise need acceptance methods, again perhaps by an expert system approach. In the future, contractors may deliver documents in PDL form when those documents are in draft status or the contractor is maintaining the document and the customer does not yet require source files for the IWSDB.

Some SGML tags were ignored by some vendors when typesetting the test documents. Acceptance of composed pages, in either printed form or Page Description Language form, must verify the consistency of the image with the SGML tagging. Omitting a major structural item such as a section head (from the page on which the section starts and from the table of contents) will be very confusing if not misleading to the intended readers.

It is highly probable that any source of format specification, be it an OS or another revision of MIL-M-38784, will have to attain a degree of rigor equal to the DTD that it supports.

3.3 Specification MIL-M-38784B

It may be that the OS under review can entirely replace MIL-B with respect to format specification. This would be the most straightforward method of untangling some of the difficulties inherited from the MIL-M-38784 series of specifications. Other content in MIL-B not specifically related to imaging issues could benefit from an update based on current electronic authoring and production practices.

3.4 Further Tests

The use of document fragments in this test left some questions unanswerable because the tagged text that would have provided answers was missing. Except in the case of tests oriented towards transfers of sets of change pages, it is recommended that only complete reference documents be used in the future. In the past, it has been CTN policy to base tests only on documents that have been approved for use. This policy tends to filter out document instances that have questionable content or appearance. It is recommended that this policy be continued.

Future PSST tests might best serve CALS goals by emphasizing early testing of changes and additions to the CALS core standards. The impending OS for Specification MIL-M-28001 is one obvious opportunity. Considering the low degree of consensus obtained in this test, another test with the same group of vendors (others could be added) using the draft OS could accelerate the validation process.

4 Exhibits

Some of the titles of Exhibits (viewgraphs) listed below have a parenthetical cross-reference to other Exhibits to facilitate comparisons between the two documents. The titles do not appear on Exhibits 32-35. The titles given are transcribed exactly from MIL-B (including the misspelled word).

1. Publishing Systems Structured Test: An Experiment (PSST)
2. PSST Objective
3. PSST Contributors
4. PSST Input 1: Prepared by SoftQuad (18)
5. PSST Output 1: A Long View (19)
6. PSST Output 1: Chapter Heading
7. PSST Output 1: The Section Head (21)
8. PSST Output 1: Type Faces (22)
9. PSST Output 1: Paragraph Heads (23)
10. PSST Output 1: Paragraph Heads (Cont'd) (24)
11. PSST Output 1: Justification (25)
12. PSST Output 1: Layout Efficiency (26)
13. PSST Output 1: The List (27)
14. PSST Output 1: Running Heads (28)
15. PSST Output 1: The Table (29)
16. PSST Output 1: Column Width
17. PSST Output 1: Summary (30)

CALS TEST NETWORK

PUBLISHING SYSTEMS STRUCTURED TEST

AN EXPERIMENT

PSST

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NEW ORLEANS
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CALS TEST NETWORK

PSST OBJECTIVE

- 2.1 PHASE I OBJECTIVE:

  USING A SMALL SAMPLE OF MILITARY TECHNICAL MANUAL PAGES, DETERMINE THE ACCURACY, COMPLETENESS, AND EASE OF UNDERSTANDING, AND DISCLOSE ANY AMBIGUITIES OF THE DTD FOR MIL-M-38784 CONFORMING TECHNICAL MANUALS IN APPENDIX A OF MIL-M-28001.

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CALS TEST NETWORK

PSST CONTRIBUTORS

- CONTRIBUTORS:

  A. SOFTQUAD

  B. SCRIBE

  C. DATALOGICS

  D. INTERLEAF

  E. EXOTERICA

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CALS TEST NETWORK

PSST INPUT 1: PREPARED BY SOFTQUAD

```
. Conforming sample document

<!DOCTYPE DOC PUBLIC "-//USA-DOD//DTD MIL-M-38784B//EN"
[
  <!ENTITY PM "\[+-]" -- +/- -->
]>
<!--A MIL-D-28001 CALS Conforming Document:  -->

<!--
        This document was created from pages provided by the U.S. Navy,
        scanned, marked up using the Avalanche Intelligent Markup
        System, cleaned and verified using SoftQuad Author/Editor and
        double checked with the Sobemap MARK-IT parser.
-->

<DOC BRANCH="NAVY"><BODY ><CHAPTER LABEL="3"><TITLE >FUNCTIONAL DESCRIPTION

</TITLE>
<SECTION LABEL="0"><PARAO LABEL="3-3."><TITLE > MAJOR FUNCTIONAL  DESCRIPTION.
 </TITLE>
<PARATEXT >The following paragraphs describe the functional
operation of the O-1695 Cesium Beam Frequency
Standard assemblies. Figure 3-4 is a functional block
    gram of t          For convenience of locating
```

WINTER TECH DOC
NEW ORLEANS
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CALS TEST NETWORK

PSST OUTPUT 1: A LONG VIEW

CHAPTER 3
FUNCTIONAL DESCRIPTION

3 3 MAJOR FUNCTIONAL DESCRIPTION
The following paragraphs describe the functional operation of the 0-1695 Cesium Beam Frequency Standard assemblies Figure 3-4 is a functional block diagram of the 0-1695 For convenience of locating descriptions of the various circuits, they are described in Assembly Number sequence (e g , A1, A2, A3, etc) except that Motherboard descriptions precede the assemblies which are mounted on them Circuit diagrams in Chapter 5 are also arranged in the Assembly Number sequence

3 3 1 Power Supply Motherboard (A1) The Power Supply Motherboard is used as a mounting board for assemblies A2 through A5 It provides interconnection paths and input/output connections for these assemblies Unregulated +50 volts from ... power supply is distributed to several

available The Loop Control relay and integrating Amplifier are also located on A18

The Integrating Amplifier A18U1 and associatud components amplify and integrate the error signal from the Phase Detector A17, and apply it to the 5MHz Crystal Oscillator(A8)

3 3 4 +18V Regulator Assembly (A2) Assembly A2 is a switching power regulator which generates +18 Vdc ±0 7 Vdc from the unregulated + 50 volt input It is synchronize by a sync-signal from the DC Converter Assembly (A4) The +18 Vdc output is used by many 0-1695 assemblies and is also used to generate the +5 Vdc from +5V Filtered Power Supply Assembly (A23) and the -18 Vdc from DC Converter Assembly (A4) Additionally, this supply will shutdown whenever a shutdown signal is present from Ion Pump Supply (A7) In ... the +5V Power Supply (A23) and DC Con- ... Because

FUNCTIONAL DESCRIPTION

CHAPTER 3

FUNCTIONAL DESCRIPTION

Section I.

3-3. MAJOR FUNCTIONAL DESCRIPTION.

The following paragraphs describe the functional operation of the 0-1695 Cesium Beam Frequency Standard assemblies. Figure 3-4 is a functional block diagram of the 0-1695 For convenience of locating descriptions of the various circuits, they are described in Assembly Number sequence (e g., A1, A2, A3, etc.) except that Motherboard descriptions precede the assemblies which are mounted on them. Circuit diagrams in Chapter 5 are also arranged in the Assembly Number sequence.

3-3.1. Power Supply Motherboard (A1). The Power Supply Motherboard is used as a mounting board for assemblies A2 through A5 It provides interconnection paths and input/output connections for these assemblies. Unregulated +50 volts from the chassis power supply is distributed to several connectors via the +50 volt bus. The

3-3.4. +18V Regulator Assembly (A2). Assembly A2 is a switching power regulator which generates +18 Vdc ± 0 7 Vdc from the unregulated + 50 volt input. It is synchronize by a sync-signal from the DC Converter Assembly (A4). The +18 Vdc output is used by many 0-1695 assemblies and is also used to generate the +5 Vdc from +5V Filtered Power Supply Assembly (A23) and the -18 Vdc from DC Converter Assembly (A4). Additionally, this supply will shutdown whenever a shutdown signal is present from Ion Pump Supply (A7). In turn, the +5V Power Supply (A23) and DC Converter Assemblies (A4) will also turn off Because the A2 output affects all the main power supplies it can be considered the key power supply in the 0-1695. Figure 3-5 is a simplified block diagram of the A2 circuits.

3-3.5. C-Field Regulator (A3). Assembly A3 provides current to the Cesium Beam Tube (A15) C-Field coil The current is controlled by U1, Q1 and associated components. Operational Amplifier U1 drives Current Regulator Q1, and

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CHAPTER 3

FUNCTIONAL DESCRIPTION

SECTION 0.

3 3 MAJOR FUNCTIONAL DESCRIPTION

The following paragraphs describe the functional operation of the 0-1695 Cesium Beam Frequency Standard assemblies Figure 3-4 is a functional block diagram of the 0 1695 For convenience of locating descriptions of the various circuits, they are described in Assembly Number sequence (e g A1 A2, A3 etc) except that Motherboard descriptions precede the assemblies which are mounted on them Circuit diagrams in Chapter 5 are also arranged in the Assembly Number sequence

3 3 1 Power Supply Motherboard (A1) The Power Supply Motherboard is used as a mounting board for assemblies A2 through A5 It provides interconnection paths and input/output connections for these assemblies

0 7 Vdc from the unregulated + 50 volt input It is synchronize by a sync-signal from the DC Converter Assembly (A4) The +18 Vdc output is used by many 0-1695 assemblies and is also used to generate the +5 Vdc from +5V Filtered Power Supply Assembly (A23) and the -18 Vdc from DC Converter Assembly (A4) Additionally, this supply will shutdown whenever a shutdown signal is present from Ion Pump Supply (A7) In turn the +5V Power Supply (A23) and DC Converter Assemblies (A4) will also turn off Because the A2 output affects all the main power supplies it can be considered the key power supply in the 0 1695 Figure 3-5 is a simplified block diagram of the A2 circuits

3 3 5 C Field Regulator (A3) Assembly A3 provides current to the Cesium Beam Tube (A15) C Field coil The

UNCLASSIFIED

CHAPTER 3
FUNCTIONAL DESCRIPTION

3-3. MAJOR FUNCTIONAL DESCRIPTION.

The following paragraphs describe the functional operation of the 0 1695 Cesium Beam Frequency Standard assemblies. Figure3 4 is a functional block diagram of the 0 1695 For convenience of locating descriptions of the various circuits, they are described in Assembly Number sequence (e g , A1, A2, A3, etc)except that Motherboard descriptions precede the assemblies which are mounted on them Circuit diagrams in Chapter 5 are also arranged in the Assembly Number sequence

present from Ion Pump Supply (A7). In turn, the + 5V Power Supply (A23) and DC Converter Assemblies (A4) will also turn off Because the A2 output affects all the main power supplies it can be considered the key power supply in the 0 1695 Figure 3 5 is a simplified block diagram of the A2 circuits

3-3.5. C-Field Regulator (A3). Assembly A3 provides current to the Cesium Beam Tube (A15) C Field coil The current is controlled by U1, Q1 and associated components Operational Amplifier U1 drives Current Regulator Q1, and the C Field output current from Q1 goes through R2 to A15

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CALS TEST NETWORK

PSST OUTPUT 1: CHAPTER HEADING

CHAPTER 3

FUNCTIONAL DESCRIPTION

CHAPTER 3

FUNCTIONAL DESCRIPTION

CHAPTER 3

FUNCTIONAL DESCRIPTION

CHAPTER 3

FUNCTIONAL DESCRIPTION

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CALS TEST NETWORK

PSST OUTPUT 1: THE SECTION HEAD

CHAPTER 3
FUNCTIONAL DESCRIPTION

DESCRIPTION. available. The Loop Contr

CHAPTER 3

FUNCTIONAL DESCRIPTION

SECTION 0.

CHAPTER 3

FUNCTIONAL DESCRIPTION

Section I.

UNCLASSIFIED

CHAPTER 3
FUNCTIONAL DESCRIPTION

NAL

present from Ior
Power Suppl

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Exhibit /

CALS TEST NETWORK

PSST OUTPUT 1: TYPE FACES

- WHAT DOES MIL-B REQUIRE?
- WHAT CHANGES IN TYPE SIZE ARE REQUIRED/ALLOWED?

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CALS TEST NETWORK

PSST OUTPUT 1: PARAGRAPH HEADS

3-3. MAJOR FUNCTIONAL DESCRIPTION.
The following paragraphs describe the functional operation of the 0-1695 Cesium Beam Frequency Standard assemblies. Figure 3-4 is a functional block diagram of the 0-1695. For convenience of locating descriptions of the various circuits, they are described in Assembly Number sequence (e.g., A1, A2, A3, etc.) except that Motherboa
scriptions precede the assemblies whi
d on them. Ci

3-3. <u>MAJOR FUNCTIONAL DESCRIPTION.</u>

The following paragraphs describe the functional operation of the 0-1695 Cesium Beam Frequency Standard assemblies. Figure 3-4 is a functional block diagram of the 0-1695. For convenience of locating descriptions of the various circuits, they are described in Assembly Number
(e.g., A1, A2, A3, etc.) except that Motherboard
the assemblies which are mou

3-3. <u>MAJOR FUNCTIONAL DESCRIPTION.</u>

The following paragraphs describe the functional operation of the 0-1695 Cesium Beam Frequency Standard assemblies. Figure 3-4 is a functional block diagram of the 0-1695. For convenience of locating descriptions of the various circuits, they are described in Assembly Numbe
sequence (e.g., A1, A2 A
riptions p

3-3. <u>MAJOR FUNCTIONAL DESCRIPTION</u>.

The following paragraphs describe the functional operation of the 0–1695 Cesium Beam Frequency Standard assemblies. Figure3–4 is a functional block diagram of the 0–1695. For convenience of locating descriptions of the various circuits, they are described in Assembly Number
quence (e.g., A1, A2, A3, etc.) except that Motherboar
tions precede the assemblies which are mo
it diagrams in Chapter 5 are al

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CALS TEST NETWORK

PSST OUTPUT 1: PARAGRAPH HEADS (Cont'd)

VENDOR	A	B	C	D
MIL-B PARA NUMBERING*	YES	YES	YES	YES
SAME FACE AS BODY	YES	YES	YES	NO
1ST HEADS UNDERLINED	NO	YES	YES	YES
2ND HEADS UNDERLINED	YES	YES	YES	YES
HEADS BOLDFACE	NO	YES	NO	YES
SAME SIZE AS BODY	YES	N/Y	YES	YES
HEADS ITALICISED	NO	YES	NO	NO

*ATTRIBUTE VALUE PROVIDES NUMBERING.
- SEE MIL-B, FIGURE 9

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CALS TEST NETWORK

PSST OUTPUT 1: JUSTIFICATION

Standard assemblies. Figure 3-4 is a functional block diagram of the 0-1695. For convenience of locating descriptions of the various circuits, they are described in Assembly Number sequence (e.g., A1, A2, A3, etc.) except that Motherboard descriptions precede the assemblies which are mounted on them. Circuit diagrams in Chapter 5 are also arranged in the Assembly Number sequence.

3-3.1. Power Supply Motherboard (A1). The Power Supply Motherboard is used as a mounting

semblies. Figure 3-4 is a
0-1695. For convenience of locating descriptions
various circuits, they are described in Assembly Number sequence (e.g., A1, A2, A3, etc.) except that Motherboard descriptions precede the assemblies which are mounted on them. Circuit diagrams in Chapter 5 are also arranged in the Assembly Number sequence.

3-3.1. Power Supply Motherboard (A1). The Power Supply Motherboard is used as a mounting board for assemblies A2 through A5. It provides interconnection paths and input/output connections for these assemblies.

Figure 3-4 is a functional
1695. For convenience of locating descriptio
various circuits, they are described in Assembly Numb
sequence (e.g., A1, A2, A3, etc.) except that Motherboard descriptions precede the assemblies which are mounted on them. Circuit diagrams in Chapter 5 are also arranged in the Assembly Number sequence.

3-3.1. Power Supply Motherboard (A1). The Power Supply Motherboard is used as a mounting board for

ous circuits, they are described in
sequence (e.g., A1, A2, A3, etc.) except that M
descriptions precede the assemblies which are mou
on them. Circuit diagrams in Chapter 5 are also arranged in the Assembly Number sequence.

3-3.1. Power Supply Motherboard (A1). The Power Supply Motherboard is used as a mounting board for assemblies A2 through A5. It provides interconnectio
aths and input/output connections for these ass
s.Unregulated + 50 volts from the chassis po
distributed to several connectors

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CALS TEST NETWORK

PSST OUTPUT 1: LAYOUT EFFICIENCY

Exhibit 12

... voltage to be appl...
current test point (located on A1) an...
of the C-Field current. Normal current is 1...
mA.

Power supply filtering is provided for Cesium Oven Controller (A5), the +50 volt bus, and +18V Regulator (A2) by L1 -C3-CR1, L2, and L3 respectively.

3-3.6. DC Converter (A4). The DC Converter Assembly operates from the +18 volt DC supply and generates the following:

3-3.7. Cesium Oven Controller (A5). Cesium Oven Controller (A5) regulates the oven temperature of Cesium Beam Tube (A15). Beam tube oven temperature is sensed by a thermistor within A15 and is applied to A5(7). The input control signal for A15 is the SYNC signal fro... A4(8). Various circuits in A5 utilize these signal... provide correct cesium oven current to A15 ... ...itor the A5 inputs and ou...

3-3.7. Cesium Oven Controller (A5). Cesium Oven Controller (A5) regulates the oven temperature of Cesium Beam Tube (A15). Beam tube oven temperature is sensed by a thermistor within A15 and is applied to A5(7). The input control signal for A15 is the SYNC signal from A4(8). Various circuits in A5 utilize these signals to provide ...rect cesium oven current to A15. Other circuits ... ...5 inputs and ou...

...y should fail. Assembly ... ...ually be... factory repairable only.

3-3.9. Ion Pump Supply Assembly (A7). Assembly A7 is basically a push-pull, transformer-coupled, DC-to-DC Converter which generates a nominal +2600 Vdc \[+-] 150 Vdc. The +2.6 KV is used by the Ion Pump (an

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CALS TEST NETWORK

PSST OUTPUT 1: THE LIST

a. -18 Vdc ±2 Vdc

b. Hot wire Ionizer Heater current

c. Sync signals for the Cesium Oven Controller (A5), and + 18V Power Supply (A2).

The A4 Assembly consists of an Input Filter circuit and a DC-to-DC Converter.

.7. Cesium Oven Controller
Controller (A5) re

s from the
wing:

a. -18 Vdc 2 Vdc

b. Hot wire Ionizer Heater current

c. Sync signals for the Cesium Oven Controller (A5), and + 18V Power Supply (A2).

The A4 Assembly consists of an Input Filter circuit and a DC-to-DC Converter.

1. -18 Vdc ±2 Vdc
2. Hot wire Ionizer Heater current
3. Sync signals for the Cesium Oven Controller (A5), and + 18V Power Supply (A2).

The A4 Assembly consists of an Input Filter circuit and a DC-to-DC Converter.

rates from th
llowing:

a. –18 Vdc \[+–]2 Vdc

b. Hot wire Ionizer Heater current

c. Sync signals for the Cesium Oven Controller (A5), and + 18V Power Supply (A2).

- Cesium Oven Controller (A5). Cesium Ove
r (A5) regulates the oven te
(A15). Beam

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CALS TEST NETWORK

PSST OUTPUT 1: RUNNING HEADS

- ❑ 3.2.2.4. — RUNNING HEADS — FIGURE 5
- ❑ 3.2.2.4.1.1 — SECURITY CLASSIFICATION
- ❑ 3.2.2.4.1.2 — TECHNICAL MANUAL IDENTIFICATION NUMBER

FUNCTIONAL DESCRIPTION

therefore locked to the cesium resonant frequency.

3-3.16.1 Cesium Beam Tube. The Cesium Beam Tube schematic is shown in figure 3-7. Cesium atoms effuse from the Cesium Oven and are formed into two parallel beams. The Cesium O maintained at a constant temperature Controller Asse

T.O. Publication Number

for the A15 beam tube if any failures or abnormalities occur. Figure 3-6 is a simplified block diagram of the oven controller.

FUNCTIONAL DESCRIPTION

3-3.14. VCXO and Synthesizer-Sampler Assembly (A12). An output signal of 1855.976244 Hz (5 MHz/2694) from the Synthesizer-Divider Assembly (A11) is applied to A12(6). This signal is used by A12 to maintair a 6.31588715 MHz VCXO tuned to the correct harmonic ... ency is the

electronic vacuum pump) in the Cesium Beam Tube Assembly (A15).

e input to A7 is + 19 Vdc from the 0–1695 ch... ly. A7 circuits use this input to gen... point is provided at J2...

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CALS TEST NETWORK

PSST OUTPUT 1: THE TABLE

Table 3-1. Beam Tube Input Signals

Signal	From
9192.6317743 MHz	Harmonic Generator (A14)
-2000 Volts Electron Multiplier Voltage	EM Supply (A6)
+ 2600 Volts Ion Pump Voltage	Ion Pump Supply (A7)
Ionizer and Mass Spectrometer Voltages	DC Converter (A4)
Cesium Oven Voltages	Cesium Oven Controller (A5)

Signal	From
9192.6317743 MHz	Harmonic Generator (A14)
-2000 Volts Electron Multiplier Voltage	EM Supply (A6)
+ 2600 Volts Ion Pump Voltage	Ion Pump Supply (A7)
Ionizer and Mass Spectrometer Voltages	DC Converter (A4)
Cesium Oven Voltages	Cesium Oven Controller (A5)

Table 3-1. Beam Tube Input Signals

Table 3-1: *Beam Tube Discrimination*

Signal	From
9192.6317743 MHz	Harmonic Generator (A14)
-2000 Volts Electron Multiplier Voltage	EM Supply (A6)
+ 2600 Volts Ion Pump Voltage	Ion Pump Supply (A7)
Ionizer and Mass Spectrometer Voltages	DC Converter (A4)
Cesium Oven Voltages	Cesium Oven Controller (A5)

Table 3-1. Beam Tube Input Signal

Signal	From
9192.6317743 MHz	Harmonic Generator (A14)
-2000 Volts Electron Multiplier Voltage	EM Supply (A6)
+ 2600 Volts Ion Pump Voltage	Ion Pump Supply (A7)
Ionizer and Mass Spectrometer Voltages	DC Converter (A4)
Cesium Oven Voltages	Cesium Oven Controller (A5)

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Exhibit 16

CALS TEST NETWORK

PSST OUTPUT 1: COLUMN WIDTH

3-3.1. Power Supply Motherboard (A1). The Power Supply Motherboard is used as a mounting board for assemblies A2 through A5. It provides interconnection paths and input/output connections 'or these assemblies. Unregulated +50 volts from chassis power supply is distributed to several ~ctors via the +50 volt bus. The A1 Assem~ ~ciated assemblies are located i~

PICAS 6 12 18

assemblies A2 through A5. It provides interconnection paths and input/output connections for these assemblies. Unregulated +50 volts from the chassis power supply is distributed to several connectors via the +50 volt bus. The A1 Assembly and its associated assemblies are located in a shielded casting to minimize radio-frequency interference.

3-3.1. Power Supply Motherboard (A1). The Power Supply Motherboard is used as a mounting board for assemblies A2 through A5. It provides interconnection paths and input/output connections for these assemblies. Unregulated +50 volts from the chassis power supply is distributed to several connectors via the +50 volt bus. The A1 Assembly and its associated assemblies are located in a shielded casting to minimize radio-frequency interference.

3-3.1. Power Supply Motherboard (A1). The Power Supply Motherboard is used as a mounting board for assemblies A2 through A5. It provides interconnection paths and input/output connections for these assemblies. Unregulated + 50 volts from the chassis power supply is distributed to several connectors via the + 50 volt bus. The A1 Assembly and its associated assemblies are located in a shielded casting to minimize radio-frequency interference.

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Exhibit 17

CALS TEST NETWORK

PSST OUTPUT 1: SUMMARY

- NO CONSENSUS AMONG VENDORS
- NO COMPLETE CONFORMANCE TO MIL-M-38784B
- SGML TAGS NOT "HONORED" IN SOME INSTANCES

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CALS TEST NETWORK

PSST INPUT 2: PREPARED BY SYSCON

```
notes: This file has alpha test status.
<!--The intent here is that this document conforms
to MIL-D-28001 Appendix a.50 -->
<doc branch=AF status=draft security=uc>
<body><section><para0><title>Introduction</title>
<paratext>This document consists of two sections. Do not be alarmed at
the appearance of this section of the document. It has been
constructed with the absolute minimum number of tags
permitted by MIL-M-28001. The purpose of this section is to
determine the effect of font set widths used by various
   lication systems
```

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NEW ORLEANS
FEBRUARY 27, 1989

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CALS TEST NETWORK

PSST OUTPUT 2: A LONG VIEW

INTRODUCTION This document cons sts of two sections Do not be alarmed at the appearance of this section of the document It has been con structed with the absolute minimum number of tags permitted by MIL M 28001 The purpose of this section is to determine the effect of font set widths used by various publication systems on the layout of the document The second section more closely resembles a section of a USAF technical order It contains text and tables, but no illustrations The remaining paragraphs of this section contain only text The text is composed of genuine english words although some of it is repetitious The last four characters in each primary paragraph give the total number of characters (not including tags) in that paragraph Now is the time for every good man to come to the aid of his country The quick brown fox jumps over the lazy dog Now is the time for every good man to come to the aid of his coun try The quick brown fox jumps over the lazy dog Padding1000

MORE TEXT FOR COMPOSITION Now is the time for every good man to come to the aid of his cessing instructions Now is the time for every good man to come to the aid of his country The quick brown fox jumps over the lazy dog Sesqui pedalian antideluvian machinations are even more injurious to your biological integrity than are pro cessing instructions Now is the time for every good man to come to the aid of his country Ses quipedalian antideluvian machinations are even more injurious to your biological integrity than are processing instructions Now is the time for every good man to come to the aid of his country 2000

MORE TEXT FOR COMPOSITION Now is the time for every good man to come to the aid of his country The quick brown fox jumps over the lazy dog Sesquipedalian antideluvian machinations are even more injurious to your biological integrity than are processing instructions Now is the time for every good man to come to the aid of his country The quick brown fox jumps over the lazy dog Ses quipedalian antideluvian machinations are even more injurious to your biological integrity than are processing instructions Now is the time for every good man to come to the aid of his country The

Section I.

1. INTRODUCTION.

This document consists of two sections Do not be alarmed at the appearance of this section of the document It has been constructed with the absolute minimum number of tags permitted by MIL M 28001. The purpose of this section is to determine the effect of font set widths used by various publication systems on the layout of the document. The second section more closely resembles a section of a USAF technical order It contains text and tables, but no illustrations The remaining paragraphs of this section contain only text The text is composed of genuine english words, although some of it is repetitious The last four characters in each primary paragraph give the total number of characters (not including tags) in that paragraph Now is the time for every good man to come to the aid of his country The quick brown fox jumps over the lazy dog Now is the time for every good man to come to the aid of his country The quick brown fox jumps over the lazy dog Padding1000

2. MORE TEXT FOR COMPOSITION.

Now is the time for every good man to come to the aid of his country The quick brown fox jumps over the lazy dog instructions Now is the time for every good man to come to the aid of his country 2000

3. MORE TEXT FOR COMPOSITION.

Now is the time for every good man to come to the aid of his country The quick brown fox jumps over the lazy dog Sesquipedalian anudeluvian machinations are even more injurious to your biological integrity than are processing instructions Now is the time for every good man to come to the aid of his country The quick brown fox jumps over the lazy dog. Sesquipedalian anudeluvian machinations are even more injurious to your biological integrity than are processing instructions. Now is the time for every good man to come to the aid of his country The quick brown fox jumps over the lazy dog Sesquipedalian anudeluvian machinations are even more injurious to your biological integrity than are processing instructions Now is the time for every good man to come to the aid of his country The quick brown fox jumps over the lazy dog Sesquipedalian anudeluvian machinations are even more injurious to your biological integrity than are processing instructions Now is the time for every good man to come to the aid of his country The quick brown fox jumps over the lazy dog

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1 2 MORE TEXT FOR COMPOSITION

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Exhibit 19

CALS TEST NETWORK

PSST OUTPUT 2: OBSERVATIONS

SECTION NUMBERING	—	DEFAULTS
PARAGRAPH NUMBERING	—	DEFAULTS
SINGLE VS. DOUBLE COLUMN	—	ATTRIBUTE MEANING
TABLE RULES	—	ATTRIBUTE MEANING

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CALS TEST NETWORK

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PSST OUTPUT 2: TYPE FACES

- ❑ WHAT DOES MIL-B REQUIRE?
- ❑ WHAT CHANGES IN TYPE SIZE ARE REQUIRED/ALLOWED?

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PSST OUTPUT 2: PARAGRAPH HEADS

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PSST OUTPUT 2: PARAGRAPH HEADS (Cont'd)

VENDOR	A	B	C	D
MIL-B PARA NUMBERING*	NO	YES	YES	YES
SAME FACE AS BODY	YES	YES	YES	NO
1ST HEADS UNDERLINED	NO	YES	YES	YES
2ND HEADS UNDERLINED	YES	YES	YES	YES
HEADS BOLDFACE	NO	YES	NO	YES
SAME SIZE AS BODY	YES	N/Y	YES	YES
HEADS ITALICISED	NO	YES	NO	NO

*ATTRIBUTE VALUE PROVIDES NUMBERING.
- SEE MIL-B, FIGURE 9

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PSST OUTPUT 2: JUSTIFICATION

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CALS TEST NETWORK

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Exhibit 27

CALS TEST NETWORK

PSST OUTPUT 2: THE LIST

Word List

sesquipedalian

antideluvian

polysyllabic

anachronistic

machinations

antidisestablishmentarianism

circumlocutious

mesochromaticism

disenfranchisement

supercalifragilistic

1. sesquipedalian
2. antideluvian
3. polysyllabic
4. anachronistic
5. machinations
6. antidisestablishmentarianism

8.1.1.1. Word List.

1. sesquipedalian
2. antideluvian
3. polysyllabic
4. anachronistic
5. machinations
6. antidisestablishmentarianism
7. circumlocutious
8. mesochromaticism
9. disenfranchisement
10. supercalifragilistic

2. antideluvian
3. polysyllabic
4. anachronistic
5. machinations
6. antidisestablishmentarianism
7. circumlocutious
8. mesochromaticism
9. disenfranchisement
10. supercalifragilistic

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CALS TEST NETWORK

PSST OUTPUT 2: RUNNING HEADS

- ❑ 3.2.2.4. — RUNNING HEADS — FIGURE 5
- ❑ 3.2.2.4.1.1 — SECURITY CLASSIFICATION
- ❑ 3.2.2.4.1.2 — TECHNICAL MANUAL IDENTIFICATION NUMBER

ons. Now is the time for every good man to come
his country. 2000

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CALS TEST NETWORK

PSST OUTPUT 2: THE TABLE

A Five Column Ten Row Table

Row Order	Word to hyphenate	No. of Characters	Magic Numt
***			
First	sesquipedalian	14	3.14159
Second	antideluvian	12	2.7182818284
Third	polysyllabic	12	(6.6254+/-0.000
Fourth	anachronistic	13	
Fifth	machinations		

Table 1-1. A Five Column Ten Row Table

Row Order	Word to hyphenate	No. of Charac-ters	Magic Nı
***			
First	sesquipedalian	14	
Second	antideluvian	12	
Third	polysyllabic	12	(6
Fourth	anachronistic	13	
Fifth	machinations		

Row Order ***	Word to hyphenate	No. of Characters	
First	sesquipedalian	14	
Second	antideluvian	12	2.718.
Third	polysyllabic	12	(6.6254+/-
Fourth	anachronistic	13	
Fifth	machinations	12	24329020081.
Sixth	antidisestablishmentarianism	28	0.01745329.
Seventh	circumlocutious	15	
Eighth	mesochromaticism	16	011111111
Ninth	disenfranchisement	18	0FFF
Tenth	supercalifragilistic	21	2.99776×10^{10}

Table 2: ***A Five Column Ten Row Table***

Table 2-1. A Five Column Ten Row Table

Row Order	Word to hyphenate	No. of Characters	Magic Numbı
***			
First	sesquipedalian	14	3.141
Second	antideluvian		

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PSST OUTPUT 2: SUMMARY

- ☐ NO CONSENSUS AMONG VENDORS
- ☐ NO COMPLETE CONFORMANCE TO MIL-M-38784B
- ☐ SGML TAGS NOT "HONORED" IN SOME INSTANCES

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negatives as specified by the acquiring activity (multiframe negatives for foldouts) suitable for subsequent enlargement to full size photolithographic negatives which will be used to produce offset printing plates. Minimum acceptable material shall have the following features:

a. Unless otherwise specified, manuals shall be prepared double-column.

b. Single spacing

c. Unjustified right margins.

d. Headings prepared on the same composing equipment as the text.

e. Oversize sheets when the text of reproduction copy is in 12-point type.

f. Paper stock shall meet or exceed the requirements of JCP-D10 (20 pound).

g. Printing (or ink) shall be of such color and contrast to permit quality photographic reproduction.

3.2.2.1 Camera-ready copy leading and spacing. Layout shall conserve space without lessening usability or clarity of material. (See figures 5 and 6.) Blank pages and spaces shall be avoided, whenever possible. Leading and spacing as indicated by figure 3 shall be used for best legibility and conservation of space. Double spacing of text within a paragraph, or similar wastefulness, is unacceptable. Slight variations are permitted in order to avoid layout practices that would result in:

USE		TYPESET	CAPITALIZATION	LEADING (POINTS)
1.	Marginal Copy	Futura Demibold 10 Futura Bold Italic 12 Gothic or Roman Bold or Extra Bold	Upper and Lower Case	2
1a.	Publication No. or Page No.	Same as Above	Upper Case	
1b.	Change Number	Futura Demibold 10 Gothic Bold 10	Upper and Lower Case	
1c.	Security Class.	Futura Bold 14 *	Upper Case	
1d.	Page Content/ Equipment Identification	Futura Demibold 10	Upper and Lower Case	2
1e.	Deleted Page(s) Notation	Futura Demibold 8	Upper and Lower Case	2
2.	Text	Bodoni Book 10 Garamond Bold 10 Century Textbook 10	Upper and Lower Case	1
2a.	Emphasis	Futura Bold Italic 10	Upper and Lower Case	
2b.	Formulas and Equations	Century Textbook Italic 10 Cheltenham Old Style Italic 10	Upper and Lower Case	1
3.	Part Nos., Chapter Nos. and Titles, Appendix and Alphabetical Index Headings	Futura Demibold 14 * Futura Bold Condensed 14 *	Upper Case	6
4.	Section Number and Title	Futura Demibold 12 Futura Bold or Extra Bold 14 *	Upper Case	6
5. 5a.	Paragraph Headings Primary Sideheads	Futura Demibold 12 Futura Bold or Extra Bold Condensed	Upper Case	2
5b	First Subordinate Sidehead	Futura Bold Italic 10 Futura Bold or Extra Bold Condensed 10 Roman Bold 10	Upper and Lower Case	1

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	USE	TYPESET	CAPITALIZATION	LEADING (POINTS)
5c.	Second Subordinate Sidehead	Century Textbook Italic 10 Roman Bold 10	Upper and Lower Case	1
5d.	Third Subordinate Sidehead	Century Textbook Italic 10 Roman Bold 10	Upper Case for First Letter of Each Word	1
5e.	Fourth Subordinate Sidehead	Century Textbook Italic 10 Roman Bold 10	Upper Case for First Letter of Each Principal Word	1
6.	Figure No. and Title	Century Textbook Italic 8 Futura Demibold Italic 10	Upper Case for First Letter of Each Principal Word	2
7.	Legend (Key)			
7a.	On Artwork	Century Textbook 8, Bodoni Book 8	Upper Case	1
7b.	In Text	Same as Above	Upper Case for First Letter of First Word	1
8.	Warnings (Heading)	Century Bold Italic 10 Futura Extra Bold (Boxed)	Upper Case	
9	Cautions (Heading)	Same as Above	Upper Case	
10.	Notes (Heading)	Cheltenham Old Style Italic 8 or 10 Futura Extra Bold 10	Upper Case	
11.	Footnotes	Century Textbook 8	Upper and Lower Case	1
12.	Table No. and Title	Century Textbook Italic 8 Futura Bold Italic 10	Upper Case for First Letter of Each Principal Word	2
13.	Table Column Heads	Century Textbook 10 Bodoni Book 8, Futura Bold 10	Upper Case or Upper and Lower Case	1
14.	Table Text	Century Textbook 10 or 12 Futura Bold or Medium 8	Upper and Lower Case	2
15.	Boxheads	Century Textbook 8	Upper Case or Upper and Lower Case	
16.	Rules	Hairline 2		
17	Parts Lists Column Heads	Century Textbook 8	Upper Case	1
18	Parts Listings	Century Textbook 8 or 10 Futura Bold or Medium 8 or 10	Upper and Lower Case	11

4-3 PREVENTIVE MAINTENANCE PROCEDURES

The preventive maintenance procedures listed below provide information necessary to conduct a comprehensive program of cleaning and inspecting the AN/SPS-10. Each procedure includes equipment and materials required and step-by-step instructions on how to perform the preventive maintenance.

CAUTION

Comply with Navy Safety Precautions for Forces Afloat, OPNAVINST 5100 series prior to performing preventive maintenance.

4-3.1 AIR FILTER CLEANING PROCEDURES. The air filters in the Receiver-Transmitter, the Modulator, and the Video Clutter Suppressor (AN/SPS-10 Field Change No. 22, 30, or 31 incorporated) should be cleaned monthly.

4-3.1.1 Tools and Equipment Required.

1. Warning tags
2. Vacuum cleaner with non-metalic nozzle

WARNING

High voltages that are dangerous to life may be stored on capacitors after power is removed.

4-3.1.2 Preliminary Actions.

1. Turn OFF and tag radar bulkhead main power switch in radar equipment room.
2. Locate filter in center underside of Receiver-Transmitter cabinet.
3. Locate filter on right side below connector panel on Modulator cabinet.
4. For equipments with Video Clutter Suppressor MX-8756A/SPS-10, locate filter inside cabinet door.

4-3.1.3 Procedures for Cleaning Air Filters.

1. Remove filters.
2. Vacuum filters, reversing normal air flow.
3. Inspect filters for cleanliness. If additional cleaning is required:
   a. Wash filters in solution of warm water and detergent
   b. Rinse filters in clean, fresh water.
   c. Blow excess moisture from filters with low-pressure air.
   d. Allow filters to dry thoroughly.
4. Reinstall cleaned filter.
5. Return equipment to normal readiness condition.

4-3.2 AS-936( )/SPS-10B ANTENNA ASSEMBLY AND OIL LEVEL INSPECTION, AND LUBRICATION OF ANTENNA DRIVE MOTOR. These maintenance procedures should be performed quarterly, when AS-936( )/SPS-10B Antenna Assembly (Units 19, 20, or 21) is installed.

4-3.2.1 Tools and Equipment Required.

1. Clean rags
2. Warning Tags
3. Small funnel
4. Safety harness
5. Oil, MIL-L-9000 or MIL-L-17331
6. Grease, MIL-G-23827
7. Grease, MIL-G-81322
8. 8" adjustable wrench
9. 3/4" fill pipe with grease cap

4-3.2.2 Preliminary actions.

1. Comply with ship's regulations for working aloft.
2. Turn off and tag radar bulkhead main power switch.
3. Press STOP button on Manual Controller Switch and tag "MAN ALOFT".
4. Turn Antenna Switch Control to OFF RESET.

Publication Number

CHAPTER 3

HANDLING AND STORAGE

3-1. GENERAL. Compliance with AFR 127-100 and the instructions in this manual will ensure safe handling, storage, and serviceability of widgets. Waivers and deviations will be in accordance with AFR 127-100. Stored widgets should be protected from adverse climactic conditions. The main hazards linked with the storage and handling of items listed in this TO are:

a. Blast.

b. Fragments.

c. Fire.

3-2. SPECIAL TERMS. The following terms, as defined, apply to widgets.

NOTE

Shelf and service lives are not cumulative. Any combination of shelf and service life accrued by an item cannot exceed the shelf life.

3-2.1. Shelf life: The length of time an item can remain in storage. The expiration date for shelf life on items with the month and year listed is the last day of the month.

3-2.2 Service life: The length of time an item can remain in operating configuration or in actual usage.

NOTE: For those items packed in hermetically sealed tear strip containers service life starts on date of opening and continues until item(s) are expended.

3-2.3 Magazine: Any building or structure, except an operating building, used for storage of explosives, munitions, or loaded munition components.

3-3. IDENTIFICATION. The use of standard nomenclature and lot number/serial number is mandatory for all storage records and communications. Legible identification markings will be kept on munitions in storage.

FIGURE 6. Example of single-column unjustified copy.